

**REMARKS**

In response to the Office Action dated November 20, 2002, claims 4 and 15 are amended. Claims 1-22 are now active in this application. No new matter has been added.

The indication that claims 2 and 9-13 would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims is acknowledged and appreciated.

**REJECTION OF CLAIMS UNDER 35 U.S.C. § 103**

Claims 1, 3, 8, 14 and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Garland et al. (hereinafter, Garland) in view of Zarge et al. (hereinafter, Zarge).

Claims 4-7, 15-19, 21 and 22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Garland in view of Li et al. (hereinafter, Li).

The rejection of claims 1, 3, 8 and 14 are respectfully traversed.

I. As a first issue, Applicant notes that the Examiner maintains that claim 20 is rejected with the rationale of the rejection of claim 1, as claim 20 is merely claim 1 recited as an apparatus. In this regard, Applicant wishes to point out that claim 20 is not merely claim 1 recited as apparatus, and claim 1 depends from claim 15, which is not included in this rejection. Consequently, the rejection of claim 20 as being unpatentable over Garland in view of Zarge is improper, as claim 15, from claim depends, is rejected under 35 U.S.C. § 103(a) as being unpatentable over Garland in view of Li et al.

## II. Difference between claims 1 and 8, and Garland:

Garland discloses an approach of estimation based on the distances between the vertices of the polygon model before approximation and the respective surfaces of the polygon model after approximation. In contrast, the present invention is directed to performing estimation based on the distances between the respective planes of the polygon model before approximation and the vertices of the polygon model after approximation.

Specifically, Garland discloses, in Section 4.1 and 5, that  $Q$  is calculated with respect to all the vertices of a polygon model *in an original or initial metric*.  $Q$  is calculated based on the planes ( $p$ ) connecting the vertices. The term  $p$  planes( $v$ ) of  $\Sigma$  in the mathematical expression (2) represents that  $Q$  is calculated based on the planes ( $p$ ) connecting the vertices.

In order to implement the above estimation approach, it is necessary that the direction of the plane in the initial metric is stable. Actually, however, it is often the case that the direction of the plane in the original metric is unstable. In view of this, Garland attempts to obtain a better result by performing estimation based on the distances between the vertices of the polygon model at an initial metric and the respective planes of the polygon model after approximation, rather than performing estimation based on the distances between the respective planes of the polygon model at the initial metric and the vertices of the polygon model after reduction.

As Garland does not disclose that estimation is made based on the distances between the respective surfaces of the polygon model before approximation and the vertices of the polygon model after approximation, independent claims 1 and 8, as well as dependent claims 3, 14 and 20, are patentable over Garland, even when considered in view of Zarge. Consequently, the allowance of claims 1-3 and 8-14 is respectfully solicited.

III. To expedite prosecution, independent claims 4 and 15 are amended to change “the portion that has been involved in all the previous data reductions” to indicate that “the portion where the estimation value has been affected”, namely “the portion where re-calculation is necessitated”.

Difference between amended claims 4 and 15, and Li:

Li discloses data reduction of the portions where the planes do not share a vertex in common are performed individually. However, Li does not disclose or suggest that the estimation value is affected as a result of data reduction, and recalculation is necessary. According to the invention recited in amended claims 4 and 15, the portion where recalculation of the estimation value is required is not used for data reduction because the portion is defined as a reduction prohibition area. In the present invention, data reduction can be carried out at a high speed because recalculation of the estimation value is unnecessary with respect to the reduction prohibition area. Li neither discloses nor suggests such arrangement.

More specifically, Li discloses an idea that in the case where an edge removal process and a vertex split process are carried out reversibly, data reduction can be carried out individually with respect to the portions where planes do not share a vertex (see FIG. 8(a) and 8(b) for the edge removal process and the vertex split process). On the other hand, according to the present invention, data reduction is not limited to the portion where the planes share a vertex. In the present invention, data reduction is performed with respect to a portion that is affected by an estimation value. For instance, in the case where the estimation value is calculated at a point within the distance  $x$  from a target point, then, the portion comprised of the points within the distance  $x$  from the target point is defined as the portion that is affected by the estimation value.

Further, in the case where the estimation value lies on a certain side (edge) of a polygon, and either one of the opposite end points of the edge is defined as a vertex for edge removal process, it is not necessary that data reduction is prohibited with respect to the edge having the end point in common.

Thus, amended independent claims 4 and 15, as well as dependent claims 5-7 and 16-22, are patentable over Garland and Li considered alone or in combination. Consequently, the allowance of claims 4-7 and 15-22 is respectfully solicited.

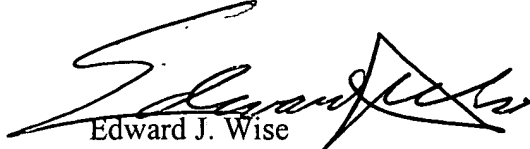
### **CONCLUSION**

Accordingly, it is urged that the application, as now amended, is in condition for allowance, an indication of which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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